

## **Broadleaf Perennials** (or why does my pasture have so many dandelions?)

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In almost every pasture there are broadleaf species that we didn't plant. Not all should be automatically placed in the weed category. In a pasture setting, we might want to be less judgmental and think of them in ecological terms. In a previous column, I talked about 'complex' pasture mixtures and the role of different functional groups in pasture dynamics (see "Pasture Seeding Mixes: the More, the Merrier?" at [www.uwrf.edu/grazing](http://www.uwrf.edu/grazing) or contact me for a copy). Broadleaf plants are one of three functional groups that exist in grassland systems, along with grasses and legumes. The idea behind functional groups is that each fills a 'niche,' playing a unique role in the system. Through differences in rooting depth, leaf structure, and nutrient requirements, these three functional groups optimize resource use and productivity.

Thus, whether we plant them or not, broadleaf species are likely to come into a sward to fill that gap. Broadleaf plants tend to differ in some other interesting ways as well. Many are quite palatable and of exceptional quality in their vegetative stage. Research suggests that most broadleaf pasture species tend to accumulate essential minerals required by livestock. Absolute amounts taken up will vary with the plant species and the soil it is grown on, but, in general they are higher than grasses and legumes.

So, overall, dandelions aren't so bad. They make palatable and high quality forage, but they're relatively unproductive in terms of tonnage. They or another broadleaf will be there whether we want them or not, so we may want to consider filling that niche in the pasture ecosystem with a broadleaf forage species that has been bred for quality AND production. Unfortunately, there aren't really a lot of choices when it comes to broadleaf perennials for pastures. The two that have the best promise in the Upper Midwest are chicory and plantain.

### Forage Chicory.

General description. Forage chicory (*Cicorium intybus*) is the same species as the blue flowered chicory plant that we see growing along roadsides in August. Unlike the roadside types, forage chicory is very leafy and slow to bolt, although it will flower if it is not grazed. The leaves look quite similar to dandelion. Trials in Pennsylvania recorded yields averaging two to three tons dry matter per acre in mixed stands up to six t/a when seeded alone. In a mixed sward, you can probably expect chicory to increase pasture yield, since it will theoretically be displacing lower yielding dandelions and other broadleaf weeds.

Chicory is adapted to climate conditions throughout our region and is compatible with all of our common cool-season grasses and legumes. Although it does best on loamy, well-drained soils, it has a deep taproot and is quite drought tolerant. Maintained in a well-managed grazing system, chicory is very high in quality, with protein levels between 20 and 30% and phenomenal digestibility levels of >90%. It is highly palatable. Like all pasture plants, its flower and seed stems are considerably lower in quality and less palatable.

Establishment and management. The most common variety currently available in the U.S. is 'Puna.' A newer variety, 'Forage Feast,' was developed in France and is available from a few sources here in the U.S. The seed is relatively expensive at \$7-8/pound for Puna. A little goes a long way, though. Seeding rates range from 1 to 2 pounds/acre in a mixture to 3 to 4 pounds/acre seeded alone. Frost seeding into existing pastures is a common practice.

Chicory is unique among pasture species in that it tolerates very low pH levels, down as far as 4.5. Yield and plant health are optimized at levels between 5.5 and 6.5 however. Chicory has phosphorus and potash requirements similar to the grasses and legumes they share the pasture with and, like grass, it is very responsive to nitrogen. In other words, fertilizing for the grasses will keep chicory healthy and vigorous as well. And like the grasses, late summer and fall are the best times to fertilize with nitrogen. Spring N fertilization tends to promote flower stem growth.

Newly seeded chicory is sensitive to treading. One grazier I know has had good success seeding it along fencelines, where it can establish undisturbed. Over time it spreads out into the paddocks from the edges. Another grazier has had good success seeding it into areas where hay was fed the previous winter. The combination of bare ground, manure, and waste hay provide a good seed bed for chicory and other hard-to-establish species (like kura clover and reed canarygrass). Obviously, you're not going to get a uniform distribution of plants using this method, but over time, distribution will improve.

### Plantain

New Zealand is poised to introduce improved varieties of a second broadleaf forage plant for pasture production: plantain. Yes, this is the same plantain that grows in our lawns. Plantain is a fairly common genus of temperate grasslands throughout the world. Two varieties of the English type (*Plantago lanceolata*), 'Grasslands Lancelot' and 'Ceres Tonic,' have been developed for pasture use and may be available in the near future.

Plantain is attracting interest as a pasture plant because it contains high levels of mineral nutrients as well as a number of biologically active compounds that can positively influence rumen function and overall animal health. It also appears to store calcium in forms that are more readily used by livestock. Further research on the English species is being conducted to document these effects.

Nutritionally, plantain is similar to chicory, with reasonable protein levels and high digestibility. Seed stems and older leaves are unpalatable. As a component of a pasture sward, plantain can be expected to neither increase nor decrease overall production. Solid stand yields are comparable to most other pasture species. In a mixed stand, plantain would be likely to displace broadleaf weeds, not grasses or legumes.

Plantain should function well as a palatable component of most pasture swards and is especially well adapted to low fertility, low moisture settings. Like chicory, it is responsive to nitrogen; however, it is more tolerant of low P and K soils. It does not have the tap root characteristic of chicory, although it does root more deeply than most grasses and is both drought and heat tolerant. It establishes rapidly but competes poorly when seeded simultaneously with grasses. Although we have not worked with it yet, plantain is likely to respond well to frost seeding and other approaches used for chicory. As with all new crops, there is a lot we don't know about plantain.

What other broadleaf species might work in a pasture mix? Dr. Ken Albrecht, a UW Madison Forage Researcher, is looking at cupplant (*Silphium perfoliatum*), a native species related to the sunflower, as a forage crop. His work has focused on using this high quality, very productive, and long-lived perennial for silage, but it may have some potential in a pasture setting. Graziers working with Dr. Laura Jackson at the University of Northern Iowa have planted it into their pastures and the cattle seem to like it. Cupplant tends to absorb a lot of phosphorus and may provide a means of getting phosphorus into animals (especially dairy cattle) in a more available form.

Small burnet (*Sanguisorba minor*) is another minor broadleaf perennial we can consider. This is a small, bushy plant with finely dissected leaves, similar to locust leaves in appearance. It is well adapted to a range of soil types from sandy to clayey and is tolerant of salinity and low fertility soils.

A final possibility is our old friend the dandelion. Although the forage industry hasn't caught on yet, the gourmet dining industry has developed high quality, leafy, productive dandelion varieties for use in salads. If we can find large enough quantities of seed of these varieties, they might be just the ticket for Wisconsin pastures.

All of these perennial broadleaf species are relatively untested in Upper Midwestern pasture systems. If you're interested in trying them, start small and plant them in a place where you can keep an eye on them. Then, use your best observational skills to evaluate their strengths and weaknesses. You might even want to take notes or photos as they grow and develop. The information you gather will help you decide whether they will work in your system or not. Feel free to contact me if you have trouble finding a seed source, or would like more information on any of the species discussed here.